

We claim:

1. A method of manufacturing a microcellular polyurethane foam, comprising:

selecting a methylene diphenyl diisocyanate (MDI)-ester isocyanate-terminated prepolymer containing less than 12% functionality;

preparing a curative component by mixing a polyol, water, a foam surfactant, and a catalyst component comprising a standard solid cast polyurethane catalyst and a delayed-action metal catalyst wherein said water comprises between 1% and 5% by weight of said curative component; and

mixing said curative component with said MDI-ester isocyanate-terminated prepolymer at a mole ratio of about 1:1, provided that if said MDI-ester isocyanate-terminated prepolymer or said curative component is present in excess of one over the other, the maximum percentage of said excess over the other is 2%.

2. The method of claim 1, further comprising dispensing the reactive mixture into a mold to cure.

3. The method of claim 2, further comprising maintaining a mold temperature of about 160°F to about 200°F.

4. The method of claim 2, wherein the mold is configured to form a solid circular tire for attachment to a hub of a bowling ball lift wheel.

5. The method of claim 2, wherein the mold is configured to form a solid circular tire for attachment to a molded solid cast elastomer, which is attached to a steel roller for use as a zero crush roll in the manufacturing process for producing corrugated board-stock.

6. The method of claim 1, further comprising preheating the prepolymer prior to the introduction of the curative component.

7. The method of claim 1, further comprising injecting a gas into the mixture of the curative component of the prepolymer.

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8. The method of claim 1, wherein the isocyanate-terminated prepolymer has an isocyanate concentration of less than about 10%.

9. The method of claim 1, wherein the water concentration is between about 1.5 to about 3% by weight of the curative component.

10. The method of claim 1, wherein the foam surfactant concentration is above about 1% of the curative component.

11. The method of claim 1, wherein the catalyst component concentration is between about 0.5 to about 0.6% of the curative component.

12. The method of claim 1, wherein the NCO to OH ratio is between about .96 and 1.02.

13. The product manufactured according to the method of claim 1.

14. A method of making a solid circular tire for attachment to a hub of a bowling ball lift wheel, comprising:

configuring a mold to a shape defining a solid circular tire for attachment to a hub of a bowling ball wheel lift;

selecting a methylene diphenyl diisocyanate (MDI)-ester isocyanate-terminated prepolymer containing less than 12% functionality;

preparing a curative component by mixing a polyol, water, a foam surfactant, and a catalyst component comprising a standard solid cast polyurethane catalyst and a delayed-action metal catalyst wherein said water comprises between 1% and 5% by weight of said curative component;

mixing said curative component with said MDI-ester isocyanate-terminated prepolymer at a mole ratio of about 1:1, provided that if said MDI-ester isocyanate-terminated prepolymer or said curative component is present in excess of one over the other, the maximum percentage of said excess over the other is 2%; and

molding the mixture thus produced in said mold.

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15. The product manufactured according to the method of claim 14.

16. A method of making and using a solid circular tire, comprising:

configuring a mold to a shape defining a solid circular tire;

selecting a methylene diphenyl diisocyanate (MDI)-ester isocyanate-terminated prepolymer containing less than 12% functionality;

preparing a curative component by mixing a polyol, water, a foam surfactant, and a catalyst component comprising a standard solid cast polyurethane catalyst and a delayed-action metal catalyst wherein said water comprises between 1% and 5% by weight of said curative component;

mixing said curative component with said MDI-ester isocyanate-terminated prepolymer at a mole ratio of about 1:1, provided that if said MDI-ester isocyanate-terminated prepolymer or said curative component is present in excess of one over the other, the maximum percentage of said excess over the other is 2%;

molding the mixture thus produced in said mold;

attaching the solid circular tire thus formed to a molded solid cast elastomer;

and

attaching said molded solid cast elastomer to a steel roller for use as a zero crush roll in the manufacturing process for producing corrugated board-stock.

17. The product manufactured according to the method of claim 16.

18. The method of claim 1, further comprising applying pressure to one or both of the components during processing.